

# SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-43

**Name:** Dimock Lake **County:** Hutchinson

**Legal Description:** T100N-R60W-Sec. 15

**Location from nearest town:** 3 miles east of Dimock, SD

**Dates of present survey:** August 9-11, 2010 (netting)

**Date last surveyed:** August 11-13, 2008 (netting); June 18, 2008 (electrofishing)

Managed Species	Other Species
Largemouth Bass	Yellow Perch
Black Crappie	Northern Pike
White Crappie	Walleye
Bluegill	Green Sunfish
Channel Catfish	Orange-spotted Sunfish
Black Bullhead	
Common Carp	

## PHYSICAL DATA

**Surface Area:** 148 acres

**Maximum depth:** 18 feet

**Volume:** 847 acre-feet

**Contour map available:** Yes

**OHWM elevation:** None set

**Outlet elevation:** None set

**Lake elevation observed during the survey:** Full

**Beneficial use classifications:** (5) warmwater semi-permanent fish propagation, (7) immersion recreation, (8) limited-contact recreation and (9) fish and wildlife propagation and stock watering.

**Watershed:** 25,600 acres

**Mean depth:** 5.7 feet

**Shoreline length:** 5.3 miles

**Date mapped:** 1994

**Date set:** NA

**Date set:** NA

## **Introduction**

Dimock Lake was named for the nearby town of Dimock, South Dakota. The original dam was built by the Works Progress Administration in 1936. The dam was washed out in 1984 following near record precipitation in the watershed. Construction on a new dam was finished in January 1993. The lake completely refilled in February 1993 and fish stocking started later that spring.

## **Ownership of Lake and Adjacent Lakeshore Properties**

Dimock Lake is owned and managed by the South Dakota Department of Game, Fish and Parks (GFP). There is a 15-ft easement above the high water mark around the entire lake for public access.

## Fishing Access

The Dimock Lake Access Area has a single lane boat ramp, dock, picnic shelter, and public toilet. There are several areas suitable for shore fishing.

## Field Observations of Water Quality and Aquatic Vegetation

The water in Dimock Lake was turbid during the survey with a Secchi depth measurement of 36 cm (14 in). Some sago pondweed (*Potamogeton pectinatus*) was present and there are still large numbers of flooded trees in the lake. Cattails (*Typha spp.*) were present in shallow areas.

## BIOLOGICAL DATA

### Methods:

Dimock Lake was sampled on August 9-11, 2010 with nine overnight trap net sets. The trap nets are constructed with 19-mm-bar-mesh ( $\frac{3}{4}$  in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads. Trap-net sites are displayed in Figure 4.

### Results and Discussion:

### Trap Net Catch

Black bullhead (97.0%) dominated the trap-net catch while white crappies, common carp, bluegill, orange-spotted sunfish, green sunfish, black crappie, and yellow perch were also caught (Table 1).

**Table 1.** Total catch from nine overnight trap net sets at Dimock Lake, Hutchinson County, August 9-11, 2010.

Species	Number	%	CPUE <sup>1</sup>	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
<b>Black Bullhead</b>	4,752	97.0	528.0	<u>+232.0</u>	269.8	5	0	68
<b>White Crappie</b>	38	0.8	4.2	<u>+2.2</u>	14.5	29	3	84
<b>Common Carp</b>	32	0.7	3.6	<u>+2.2</u>	3.0	24	4	76
<b>Bluegill</b>	28	0.6	3.1	<u>+2.3</u>	4.7	93	0	89
<b>O. S. Sunfish</b>	26	0.5	2.9	<u>+3.4</u>	0.0	--	--	--
<b>Green Sunfish</b>	14	0.3	1.6	<u>+1.2</u>	0.8	7	0	77
<b>Black Crappie</b>	8	0.2	0.9	<u>+0.5</u>	56.4	--	--	--
<b>Yellow Perch</b>	2	0.0	0.2	<u>+0.2</u>	1.4	--	--	--

\* 5 years (2000, 2002, 2004, 2006, 2008)

<sup>1</sup> See Appendix A for definitions of CPUE, PSD, RSD-P and mean Wr.

**Table 2.** Catch per unit effort by length category for various fish species captured with gill nets in Dimock Lake August 9-11, 2010.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Black Bullhead	10.9	517.1	490.5	26.6	--	528.0	+232.0
White Crappie	--	4.2	3.0	1.1	0.1	4.2	+2.2
Common Carp	0.8	2.8	2.1	0.6	0.1	3.6	+2.2
Bluegill	--	3.1	0.2	2.9	--	3.1	+2.3
O. S. Sunfish*	--	--	--	--	--	2.9	+3.4
Green Sunfish	--	1.6	1.5	0.1	--	1.6	+1.2
Black Crappie	--	0.9	0.7	0.2	--	0.9	+0.5
Yellow Perch	--	0.2	--	0.2	--	0.2	+0.2

\*No length categories established. Length categories can be found in Appendix A.

## **Bluegill**

**Management objective:** Maintain a bluegill fishery with a trap net CPUE of at least 10 and RSD-18 of at least 20 in three out of five lake surveys.

Although bluegill CPUE increased slightly in 2010, it remains far below the management objective (Table 3). Since bluegills and largemouth bass have similar habitat requirements, the turbid water and the lack of aquatic vegetation in the lake is likely affecting both species. The average CPUE for the past 10 surveys dating back to 1994 is only 6.2 and has only been above 10 twice. It is unlikely the management objective for bluegills will ever be reached with the poor habitat and water quality existing in the lake.

**Table 3.** Bluegill trap-net CPUE, PSD, RSD-18, RSD-P, and mean Wr for Dimock Lake, Hutchinson County, 2002-2010.

	2002	2003	2004	2005	2006	2007	2008	2009	2010
CPUE	0.1		0.8		12.9		0.2		3.1
PSD	--		--		12		--		93
RSD-18	--		--		1		--		18
RSD-P	--		--		1		--		0
Mean Wr	--		--		102		--		89

## **Black and White Crappie**

**Management objective:** Maintain a crappie fishery with a trap net CPUE of at least 20 and PSD of at least 40 in three out of five lake surveys.

Black crappie numbers continued to decline (Table 4). Although several year classes are evident in the length frequencies (Figure 1), recruitment has been too low to increase abundance.

**Table 4.** Black crappie trap-net CPUE, PSD, RSD-P, and mean Wr for Dimock Lake, Hutchinson County, 2002-2010.

	2002	2003	2004	2005	2006	2007	2008	2009	2010
CPUE	103.9		78.2		38.8		8.9		0.9
PSD	35		3		13		64		--
RSD-P	3		0		0		36		--
Mean Wr	98		94		93		116		--

White crappie trap-net CPUE and PSD also declined in 2010 (Table 5). The fish sampled ranged in length from 140-280 mm (4.3-12.6 in.) with a mean length of 190 mm (7.0 in) (Figure 2).

Total CPUE for both crappie species has declined over the last 4 surveys from 128.3 in 2002 to only 5.3 this year. It is likely the poor water quality is also affecting the crappie populations.

**Table 5.** White crappie trap-net CPUE, PSD, RSD-P, and mean Wr for Dimock Lake, Hutchinson County, 2002-2010.

	2002	2003	2004	2005	2006	2007	2008	2009	2010
CPUE	24.4		4.2		8.0		18.8		4.2
PSD	16		0		14		41		29
RSD-P	8		0		3		4		3
Mean Wr	97		105		93		95		84

## **Black Bullhead**

**Management objective:** Maintain a black bullhead population with a trap-net CPUE of less than 100.

Black bullhead abundance is high (Table 6) and the fish in the population are very small with a mean length of 183 mm (7.2 in). Very few bullheads in the lake ever reach 25 cm (10 in) (Figure 3). Bullhead abundance will likely remain high unless significant numbers of predators like catfish or walleyes can be established and maintained.

**Table 6.** Black bullhead trap-net CPUE, PSD, RSD-P, and mean Wr for Dimock Lake, Hutchinson County, 2002-2010.

	2002	2003	2004	2005	2006	2007	2008	2009	2010
CPUE	510.7		120.6		97.6		597.5		528.0
PSD	15		2		0		48		5
RSD-P	0		0		0		0		0
Mean Wr	85		76		70		85		68
Mean Length	136		177		193		150		183

## **All Species**

The Dimock Lake fish population is currently unbalanced with too few game fish and too many bullheads (Table 7).

**Table 7.** Electrofishing (EF), and trap-net (TN) CPUE for all fish species sampled in Dimock Lake, Hutchinson County, 2002-2010.

<b>Species</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
<b>COC (TN)</b>	2.1		4.4		0.7		6.2		3.6
<b>BLB (TN)</b>	510.7		120.6		97.6		597.5		528.0
<b>CCF (TN)</b>	1.9		4.8		6.9		0.1		--
<b>NOP (TN)</b>	0.6		0.2		--		--		--
<b>GSF (TN)</b>	0.2		0.6		1.8		1.2		1.6
<b>HYB (TN)</b>	--		--		2.1		--		--
<b>BLG (TN)</b>	0.1		0.8		12.9		0.2		3.1
<b>LMB (EF)</b>	5.0		7.8		21.6		0.5		--
<b>LMB (TN)</b>	--		--		0.3		--		--
<b>WHC (TN)</b>	24.4		4.2		8.0		18.8		4.2
<b>BLC (TN)</b>	103.9		78.2		38.8		8.9		0.9
<b>YEP (TN)</b>	2.6		0.4		2.3		1.5		0.2
<b>WAE (TN)</b>	--		0.2		--		--		--

COC (Common Carp), BLB (Black Bullhead), CCF (Channel Catfish), NOP (Northern Pike), GSF (Green Sunfish), HYB (Hybrid Sunfish), BLG (Bluegill), LMB (Largemouth Bass), WHC (White Crappie), BLC (Black Crappie), YEP (Yellow Perch), WAE (Walleye),

## **Winterkill Record**

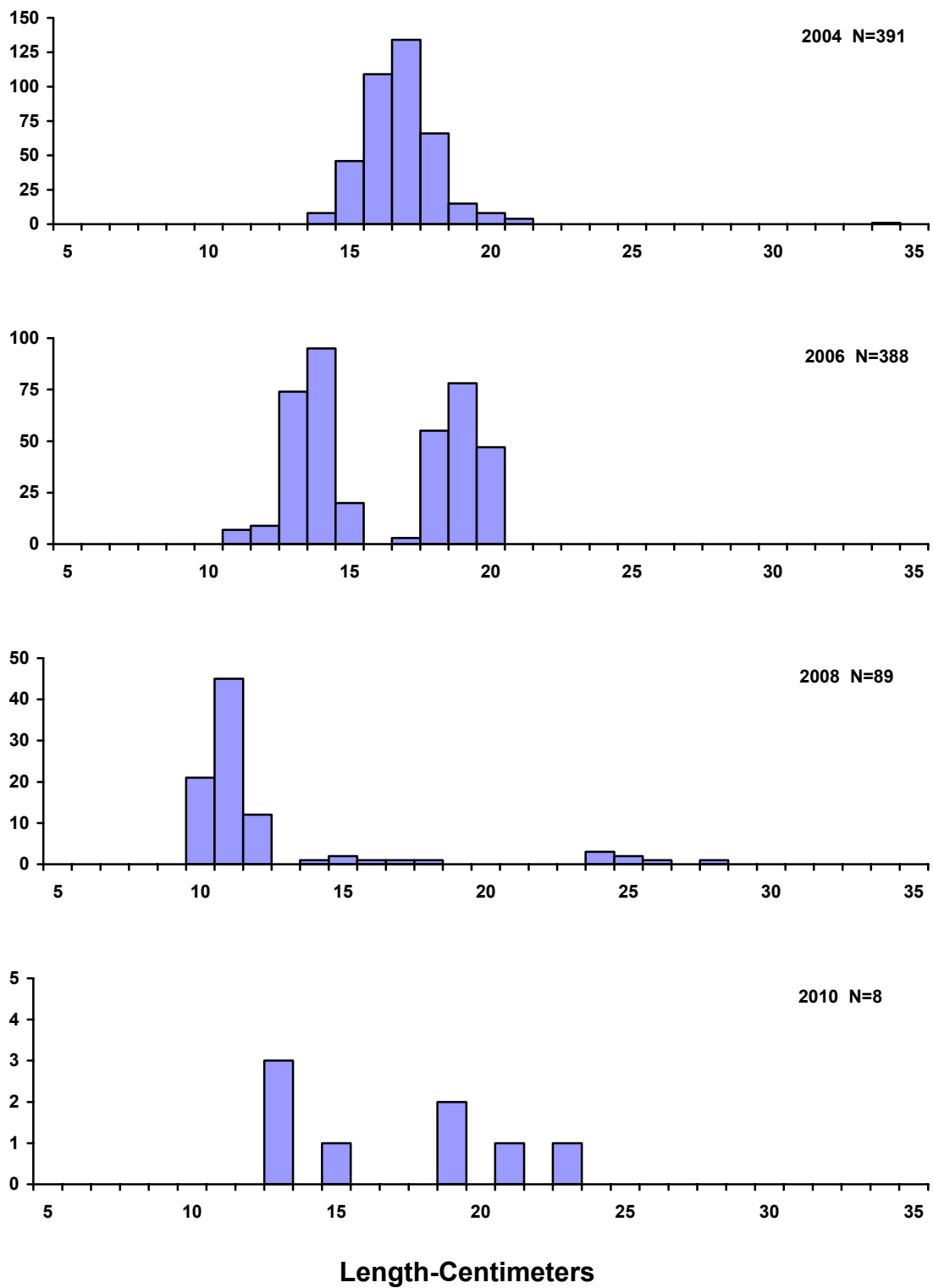
Dimock Lake suffered a severe winterkill in 2006-2007. Walleyes and black crappies were restocked but their populations have not rebounded as hoped. Additional, less severe, winterkills have occurred since 2007 which have also contributed to the inability to restore the fishery.

## **MANAGEMENT RECOMMENDATIONS**

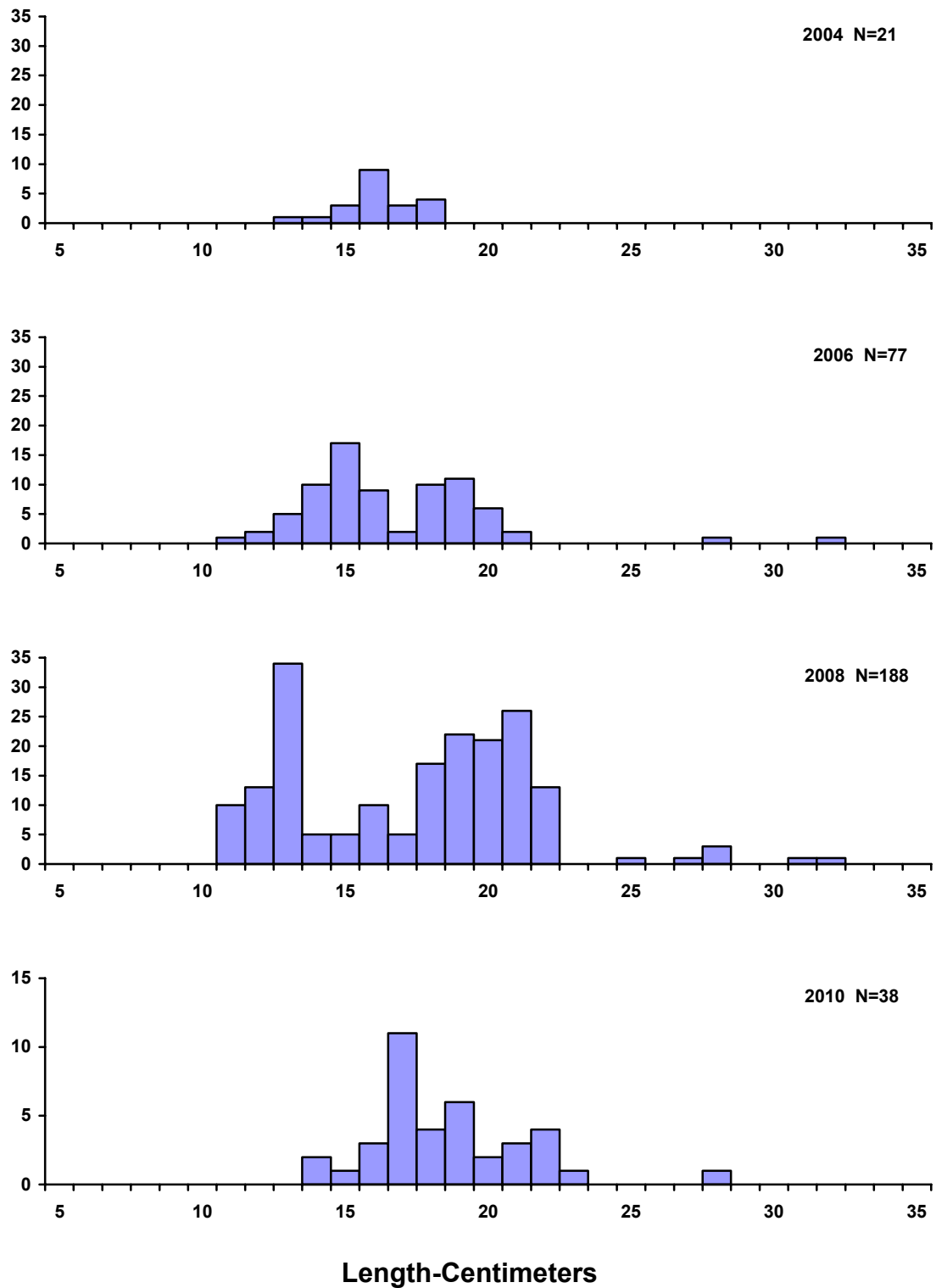
1. Discontinue largemouth bass management and stock channel catfish and walleye to supplement the predator population.
2. Conduct lake surveys every other year to monitor the fishery.
3. Investigate opportunities to improve water quality, such as an upstream retention pond or improvements in riparian habitat in the watershed.
4. Consider the possibility of using a drawdown to expose a portion of the lake bottom and evaluate the effects. Exposure should help compact and aerate sediments and promote the growth of aquatic vegetation.

**Table 8.** Stocking record for Dimock Lake, Hutchinson County, 1990-2010.

<b>Year</b>	<b>Number</b>	<b>Species</b>	<b>Size</b>
1993	54,450	Channel Catfish	Fingerling
	8,840	Largemouth Bass	Sml. Fingerling
	687	Yellow Perch	Adult
1994	2,100	Channel Catfish	Fingerling
	7,500	Largemouth Bass	Med. Fingerling
	2,339	Walleye	Lrg. Fingerling
	31	Walleye	Adult
	8,326	White Crappie	Fingerling
1996	7,500	Channel Catfish	Fingerling
	6,500	Largemouth Bass	Fingerling
	1,875	Walleye	Fingerling
	748	Yellow Perch	Adult
	741	White Crappie	Adult
1998	750	White Crappie	Adult
1999	750	White Crappie	Adult
2000	1,096	Black Crappie	Adult
2001	7,500	Largemouth Bass	Fingerling
2005	174	Channel Catfish	Adult
2006	150	Channel Catfish	Adult
2007	750	Black Crappie	Adult
	345	Walleye	Adult
	102	Walleye	Juvenile

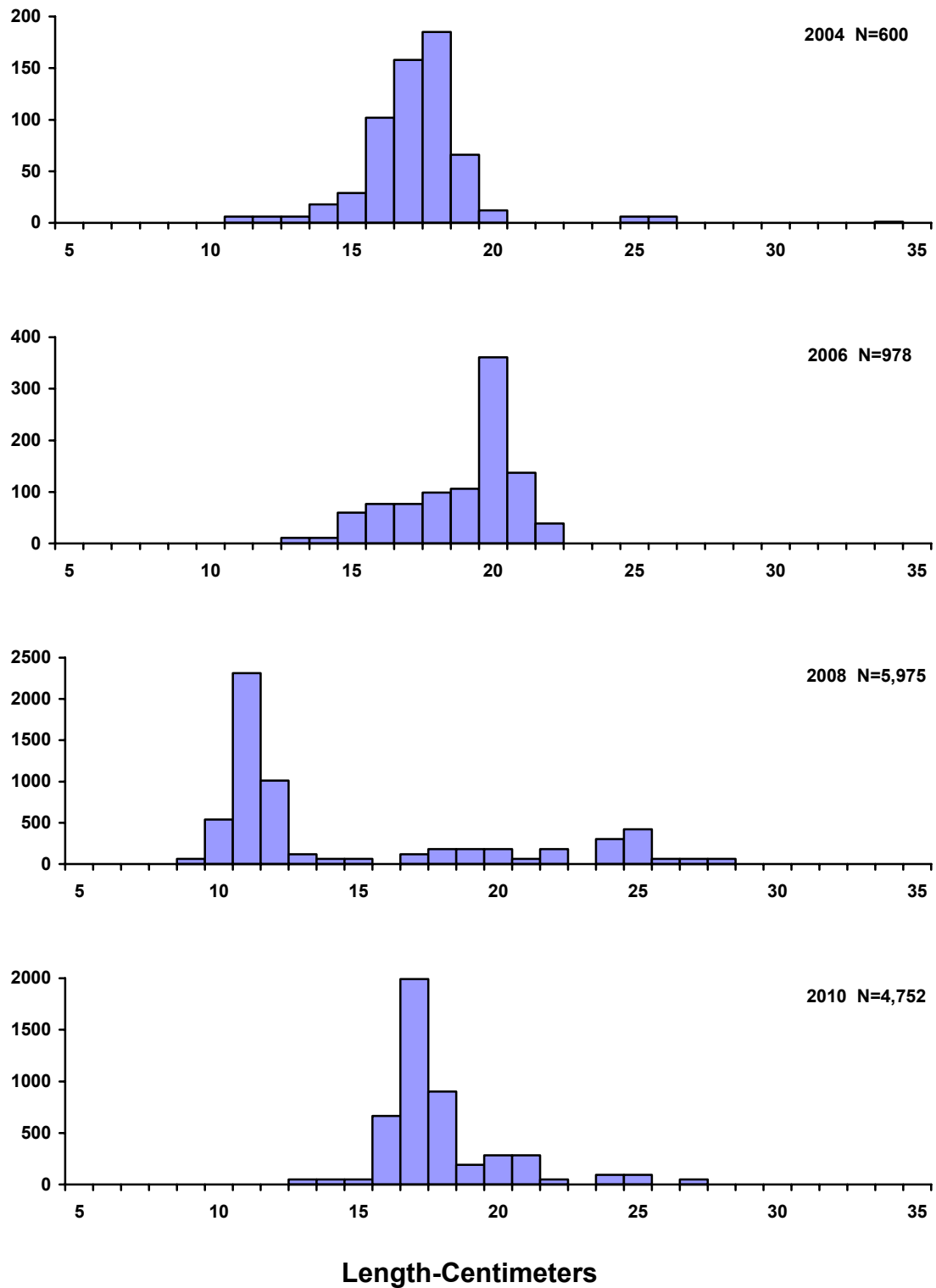


**Figure 1.** Length frequency histograms for black crappie sampled with trap nets in Dimock Lake, Hutchinson County, 2004, 2006, 2008, and 2010.



**Figure 2.** Length frequency histograms for white crappies sampled with trap nets in Dimock Lake, Hutchinson County, 2004, 2006, 2008, and 2010.



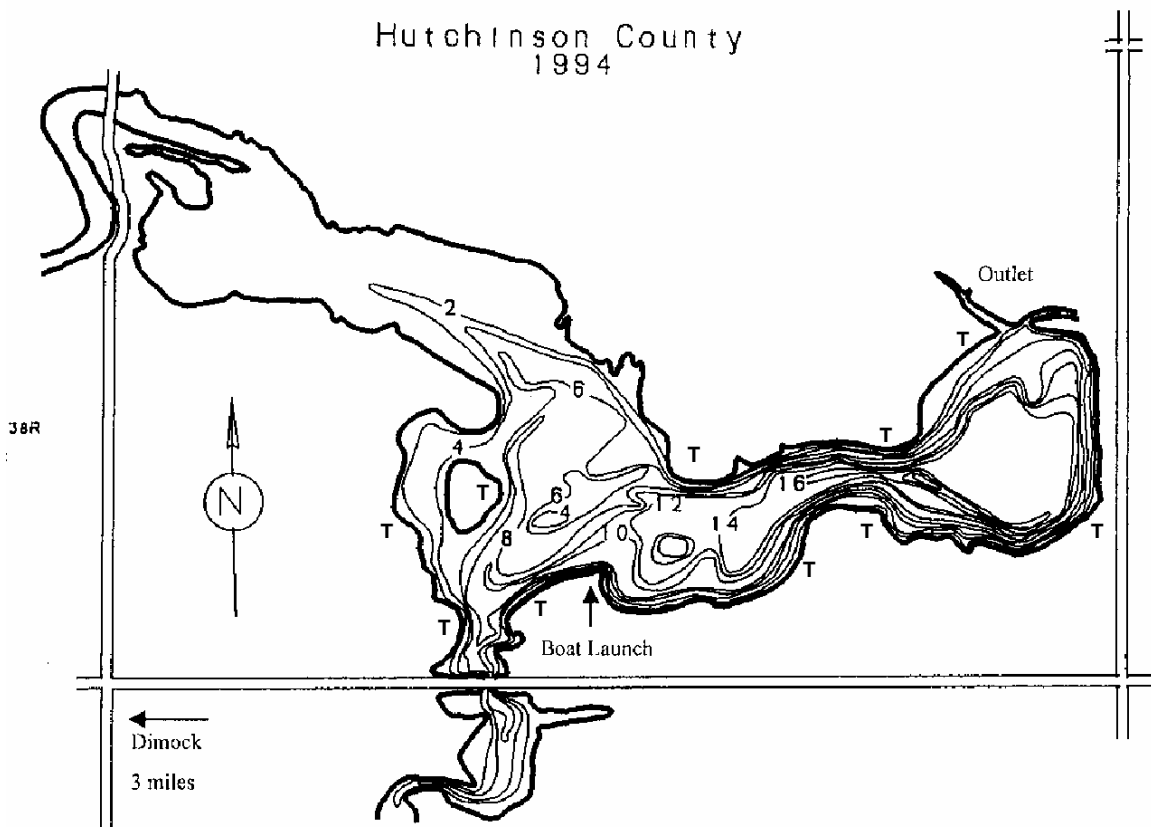


**Figure 3.** Length frequency histograms for black bullheads sampled with trap nets in Dimock Lake, Hutchinson County, 2004, 2006, 2008, and 2010.

South Dakota Department of Game, Fish and Parks

# Dimock Lake

Hutchinson County  
1994



**Legend** Trap Net Sites: T

**Figure 4.** Sampling sites on Dimock Lake, Hutchinson County, 2010.

**Appendix A.** A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

**Catch Per Unit Effort (CPUE)** is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill-net nights of effort, catch per hour of electrofishing, etc.

**Proportional Stock Density (PSD)** is calculated by the following formula:

$$\text{PSD} = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

**Relative Stock Density (RSD-P)** is calculated by the following formula:

$$\text{RSD-P} = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters (inches in parenthesis).

<b>Species</b>	<b>Stock</b>	<b>Quality</b>	<b>Preferred</b>	<b>Memorable</b>	<b>Trophy</b>
Walleye	25 (10)	38 (15)	51 (20)	63 (25)	76 (30)
Yellow perch	13 (5)	20 (8)	25 (10)	30 (12)	38 (15)
Black crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
White crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
Bluegill	8 (3)	15 (6)	20 (8)	25 (10)	30 (12)
Largemouth bass	20 (8)	30 (12)	38 (15)	51 (20)	63 (25)
Smallmouth bass	18 (7)	28 (11)	35(14)	43 (17)	51 (20)
Northern pike	35 (14)	53 (21)	71 (28)	86 (34)	112 (44)
Channel catfish	28 (11)	41 (16)	61 (24)	71 (28)	91 (36)
Black bullhead	15 (6)	23 (9)	30 (12)	38 (15)	46 (18)
Common carp	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)
Bigmouth buffalo	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

**Relative weight (Wr)** is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.